

## Appendix D: Definitions of Comparison Values

Following are definitions of the various health-based comparison values that ATSDR used in this PHA to put the measured and modeled levels of environmental contamination into perspective:

- CREG:** Cancer Risk Evaluation Guide, a highly conservative and theoretical value that is believed to cause no more than one excess cancer in a million persons exposed over time.
- DCG:** Derived Concentration Guide, radionuclide exposure level reported by DOE that would deliver (for inhalation pathways) an annual effective dose equivalent of 100 millirem/year to an individual who is continuously exposed 24 hours per day, 365 days per year. DOE has also calculated DCGs for ingestion exposures.
- EMEG:** Environmental Media Evaluation Guide, a media-specific comparison value that is used to select contaminants of concern. Levels below the EMEG are not expected to cause adverse noncarcinogenic health effects. These have been developed for acute exposure scenarios, intermediate exposure scenarios, and chronic exposure scenarios.
- MRL:** Minimal Risk Level, an estimate of daily human exposure to a dose of a chemical that is likely to be without an appreciable risk of adverse non-cancerous effects over a specified duration of exposure.
- NAAQS:** National Ambient Air Quality Standard, an ambient air concentration that EPA has established to characterize air quality. The standards are health-based and were designed to be protective of many sensitive populations, such as people with asthma and children. The standards have been developed only for a small subset of pollutants, and their averaging times and statistical interpretations vary among the regulated pollutants.
- RBC:** Risk-Based Concentration, a contaminant concentration that is not expected to cause adverse health effects over long-term exposure. These have been developed for both cancer outcomes (RBC-C) and non-cancer outcomes (RBC-N).
- RfC:** Reference Concentration, an ambient air concentration developed by EPA that people, including sensitive subpopulations, likely can be exposed to continuously over a lifetime without developing adverse non-cancer health effects. RfCs typically have uncertainty factors built into them to account for any perceived limitations in the data on which they are based.

## Appendix E: ATSDR Glossary of Terms

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces environmental laws to protect the environment and human health.

This glossary defines words used by ATSDR in this PHA. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-888-42-ATSDR (1-888-422-8737).

### **Acute**

Occurring over a short time [compare with **chronic**].

### **Acute exposure**

Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with **intermediate-duration exposure** and **chronic exposure**].

### **Adverse health effect**

A change in body function or cell structure that might lead to disease or health problems.

### **Ambient**

Surrounding (for example, *ambient* air).

### **Background level**

An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

### **Background radiation**

The amount of radiation to which a member of the general population is exposed from natural sources, such as terrestrial radiation from naturally occurring radionuclides in the soil, cosmic radiation originating from outer space, and naturally occurring radionuclides deposited in the human body.

### **Biota**

Plants and animals in an environment. Some of these plants and animals might be sources of food, clothing, or medicines for people.

### **Cancer**

Any one of a group of diseases that occurs when cells in the body become abnormal and grow or multiply out of control.

**Cancer risk**

A theoretical risk of for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

**Carcinogen**

A substance that causes cancer.

**Case-control study**

A study that compares exposures of people who have a disease or condition (cases) with people who do not have the disease or condition (controls). Exposures that are more common among the cases may be considered as possible risk factors for the disease.

**CERCLA**

[See **Comprehensive Environmental Response, Compensation, and Liability Act of 1980.**]

**Chronic**

Occurring over a long time (more than 1 year) [compare with **acute**].

**Chronic exposure**

Contact with a substance that occurs over a long time (more than 1 year) [compare with **acute exposure** and **intermediate-duration exposure**].

**Committed Effective Dose Equivalent (CEDE)**

The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to the organs or tissues. The *committed effective dose equivalent* is used in radiation safety because it implicitly includes the relative carcinogenic sensitivity of the various tissues. The unit of dose for the CEDE is the rem (or, in SI units, the sievert — 1 sievert equals 100 rem.)

**Comparison value (CV)**

Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

### **Completed exposure pathway**

[See **exposure pathway**.]

### **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)**

*CERCLA*, also known as **Superfund**, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by *CERCLA*, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances.

### **Concentration**

The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other medium.

### **Contaminant**

A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

### **Curie (Ci)**

A unit of radioactivity. One *curie* equals that quantity of radioactive material in which there are  $3.7 \times 10^{10}$  nuclear transformations per second. The activity of 1 gram of radium is approximately 1 Ci; the activity of 1.46 million grams of natural uranium is approximately 1 Ci.

### **Dermal**

Referring to the skin. For example, *dermal* absorption means passing through the skin.

### **Dermal contact**

Contact with (touching) the skin [see route of exposure].

### **Detection limit**

The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

### **Disease registry**

A system of ongoing registration of all cases of a particular disease or health condition in a defined population.

**Dose (for chemicals that are not radioactive)**

The amount of a substance to which a person is exposed over some time period. *Dose* is a measurement of exposure. *Dose* is often expressed as milligrams (a measure of quantity) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the *dose*, the greater the likelihood of an effect. An “exposure dose” is how much of a substance is encountered in the environment. An “absorbed dose” is the amount of a substance that actually gets into the body through the eyes, skin, stomach, intestines, or lungs.

**Dose (for radioactive chemicals)**

The radiation *dose* is the amount of energy from radiation that is actually absorbed by the body. This is not the same as measurements of the amount of radiation in the environment.

**Environmental media**

Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

**Environmental media and transport mechanism**

*Environmental media* include water, air, soil, and biota (plants and animals). *Transport mechanisms* move contaminants from the source to points where human exposure can occur. The *environmental media and transport mechanism* is the second part of an exposure pathway.

**Epidemiology**

The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

**Exposure**

Contact with a substance by swallowing, breathing, or touching the skin or eyes. *Exposure* can be short-term [see **acute exposure**], of intermediate duration [see **intermediate-duration exposure**], or long-term [see **chronic exposure**].

**Exposure assessment**

The process of finding out how people come into contact with a hazardous substance, how often and for how long they are in contact with the substance, and how much of the substance they are in contact with.

**Exposure pathway**

The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An *exposure pathway* has five parts: a **source of contamination** (such as an abandoned business); an **environmental media and transport mechanism** (such as movement through **groundwater**); a **point of exposure** (such as a private well); a **route of exposure** (eating, drinking, breathing, or touching), and a **receptor population** (people potentially or actually exposed). When all five parts are present, the *exposure pathway* is termed a **completed exposure pathway**.

**Groundwater**

Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with **surface water**].

**Hazard**

A source of potential harm from past, current, or future exposures.

**Hazardous waste**

Potentially harmful substances that have been released or discarded into the environment.

**Health consultation**

A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. *Health consultations* are focused on a specific exposure issue. They are therefore more limited than public health assessments, which review the exposure potential of each pathway and chemical [compare with **public health assessment**].

**Health education**

Programs designed with a community to help it know about health risks and how to reduce these risks.

**Health investigation**

The collection and evaluation of information about the health of community residents. This information is used to describe or count the occurrence of a disease, symptom, or clinical measure and to estimate the possible association between the occurrence and exposure to hazardous substances.

**Health statistics review**

The analysis of existing health information (i.e., from death certificates, birth defects registries, and cancer registries) to determine if there is excess disease in a specific population, geographic area, and time period. A *health statistics review* is a descriptive epidemiologic study.

**Indeterminate public health hazard**

The category used in ATSDR's public health assessment documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking.

**Incidence**

The number of new cases of disease in a defined population over a specific time period [contrast with **prevalence**].

**Ingestion**

The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see **route of exposure**].

**Inhalation**

The act of breathing. A hazardous substance can enter the body this way [see **route of exposure**].

**Intermediate-duration exposure**

Contact with a substance that occurs for more than 14 days and less than a year [compare with **acute exposure** and **chronic exposure**].

**Isotopes**

Nuclides having the same number of protons in their nuclei, and hence the same atomic number, but differing in the number of neutrons, and therefore in the mass number. Identical chemical properties exist in *isotopes* of a particular element. The term should not be used as a synonym for “nuclide,” because “isotopes” refers specifically to different nuclei of the same element.

**Migration**

Moving from one location to another.

**National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)**

**EPA’s** list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The *NPL* is updated on a regular basis.

**No apparent public health hazard**

A category used in ATSDR’s public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but is not expected to cause any harmful health effects.

**No public health hazard**

A category used in ATSDR’s public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.

**NPL**

[See National Priorities List for Uncontrolled Hazardous Waste Sites.]

**Plume**

A volume of a substance that moves from its source to places farther away from the source. *Plumes* can be described by the volume of air or water they occupy and the direction in which they move. For example, a *plume* can be a column of smoke from a chimney or a substance moving with groundwater.

**Point of exposure**

The place where someone can come into contact with a substance present in the environment [see **exposure pathway**].

**Population**

A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

**Prevalence**

The number of existing disease cases in a defined population during a specific time period [contrast with **incidence**].

### **Prevention**

Actions that reduce exposure or other risks, keep people from getting sick, or keep disease from getting worse.

### **Public comment period**

An opportunity for the public to comment on agency findings or proposed activities contained in draft reports or documents. The public comment period is a limited time period during which comments will be accepted.

### **Public health action plan**

A list of steps to protect public health.

### **Public health advisory**

A statement made by ATSDR to EPA or a state regulatory agency that a release of hazardous substances poses an immediate threat to human health. The advisory includes recommended measures to reduce exposure and reduce the threat to human health.

### **Public health assessment (PHA)**

An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed by coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health [compare with **health consultation**].

### **Public health hazard**

A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or **radionuclides** that could result in harmful health effects.

### **Public health hazard categories**

Statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five *public health hazard categories* are **no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard**.

### **Radiation**

The emission and propagation of energy through space or through a material medium in the form of waves (e.g., the emission and propagation of electromagnetic waves, or of sound and elastic waves). The term "radiation" (or "radiant energy"), when unqualified, usually refers to electromagnetic *radiation*. Such *radiation* commonly is classified according to frequency, as microwaves, infrared, visible (light), ultraviolet, and x and gamma rays and, by extension, corpuscular emission, such as alpha and beta *radiation*, neutrons, or rays of mixed or unknown type, such as cosmic *radiation*.

**Radioactive material**

Material containing radioactive atoms.

**Radioactivity**

Spontaneous nuclear transformations that result in the formation of new elements. These transformations are accomplished by emission of alpha or beta particles from the nucleus or by the capture of an orbital electron. Each of these reactions may or may not be accompanied by a gamma photon.

**Radioisotope**

An unstable or radioactive isotope (form) of an element that can change into another element by giving off radiation.

**Radionuclide**

Any radioactive isotope (form) of any element.

**RCRA**

[See **Resource Conservation and Recovery Act (1976, 1984).**]

**Receptor population**

People who could come into contact with hazardous substances [see **exposure pathway**].

**Rem**

A unit of dose equivalent that is used in the regulatory, administrative, and engineering design aspects of radiation safety practice. The dose equivalent in *rem* is numerically equal to the absorbed dose in rad multiplied by the quality factor (1 *rem* is equal to 0.01 sievert).

**Resource Conservation and Recovery Act (1976, 1984) (RCRA)**

This act regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed of, or distributed.

**Risk**

The probability that something will cause injury or harm.

**Route of exposure**

The way people come into contact with a hazardous substance. Three *routes of exposure* are breathing [**inhalation**], eating or drinking [**ingestion**], and contact with the skin [**dermal contact**].

**Sample**

A portion or piece of a whole; a selected subset of a population or subset of whatever is being studied. For example, in a study of people the *sample* is a number of people chosen from a larger population [see **population**]. An environmental *sample* (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

**Solvent**

A liquid capable of dissolving or dispersing another substance (for example, acetone or mineral spirits).

**Source of contamination**

The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A *source of contamination* is the first part of an exposure pathway.

**Special populations**

People who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered *special populations*.

**Stakeholder**

A person, group, or community who has an interest in activities at a hazardous waste site.

**Substance**

A chemical.

**Surface water**

Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with **groundwater**].

**Surveillance**

[see epidemiologic surveillance]

**Survey**

A systematic collection of information or data. A *survey* can be conducted to collect information from a group of people or from the environment. *Surveys* of a group of people can be conducted by telephone, by mail, or in person. Some *surveys* are done by interviewing a group of people.

**Toxicological profile**

An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A *toxicological profile* also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

**Toxicology**

The study of the harmful effects of substances on humans or animals.

**Uncertainty factor**

A mathematical adjustment for reasons of safety when knowledge is incomplete — for example, a factor used in the calculation of doses that are not harmful (adverse) to people. These factors are applied to the lowest-observed-adverse-effect-level (LOAEL) or the no-observed-adverse-effect-level (NOAEL) to derive a minimal risk level (MRL). *Uncertainty factors* are used to account for variations in people's sensitivity, for differences between animals and humans, and for differences between a LOAEL and a NOAEL. Scientists use *uncertainty factors* when they have some, but not all, the information from animal or human studies to decide whether an exposure will cause harm to people.

## Units, radiological

<i>Units</i>	<i>Equivalents</i>
Becquerel* (Bq)	1 disintegration per second = $2.7 \times 10^{-11}$ Ci
Curie (Ci)	$3.7 \times 10^{10}$ disintegrations per second = $3.7 \times 10^{10}$ Bq
Gray* (Gy)	1 J/kg = 100 rad
Rad (rad)	100 erg/g = 0.01 Gy
Rem (rem)	0.01 sievert
Sievert* (Sv)	100 rem

\*International Units, designated (SI)

## Urgent public health hazard

A category used in ATSDR's public health assessments for sites where short-term exposures (less than 1 year) to hazardous substances or conditions could result in harmful health effects that require rapid intervention.

## Other Glossaries and Dictionaries

Environmental Protection Agency <http://www.epa.gov/OCEPAterms/>

National Center for Environmental Health (CDC) <http://www.cdc.gov/nceh/dls/report/glossary.htm>

National Library of Medicine <http://www.nlm.nih.gov/medlineplus/mplusdictionary.html>

## Appendix F: Units of Measurement Used in this PHA

Throughout this document, ATSDR reported observations in many different units of measurement. While ATSDR can appreciate a desire to use consistent units when measuring a given phenomenon (e.g., an air concentration), the reality is that many different types of units are widely used by scientists, often due to conventions that have been followed for many years. Some of these reporting conventions vary from one type of pollutant to the next.

This appendix defines the different units of measurement used throughout this PHA and presents unit conversion information, where appropriate. This appendix should not be viewed as an exhaustive account of units of measurement. Rather, it provides perspective on the units presented throughout this PHA.

Units used when reporting concentrations of radioactive contaminants

aCi/m<sup>3</sup> = attocuries per cubic meter

pCi/m<sup>3</sup> = picocuries per cubic meter

μCi/ml = microcurie per milliliter

Note: The following information may be useful for appreciating the terminology used in these units of measurements and for converting between the units:

1,000,000 μCi = 1 Ci

1,000,000 pCi = 1 μCi

1,000,000 aCi = 1 pCi

1,000,000 ml = 1 m<sup>3</sup>

Units used when reporting concentrations of non-radioactive contaminants

μg/m<sup>3</sup> = micrograms per cubic meter

ppm = parts per million

Notes: Scientists typically report ambient air concentrations of particulate matter and metals in units of micrograms per cubic meter.

There is no widely used convention for reporting ambient air concentrations of organics and inorganic compounds. Some scientists use mass concentrations (e.g., micrograms per cubic meter and variations upon this unit); other scientists use volume concentrations (e.g., parts per million and variations upon this unit).

#### Units used when reporting stack gas concentrations

grains/dscf = grains per dry standard cubic foot

ng/dscm = nanograms per dry standard cubic meter

µg/dscm = micrograms per dry standard cubic meter

Notes: Grains are a mass measurement commonly used when reporting stack gas concentrations of particulate matter. There are 7,000 grains in a pound.

“Nanograms” and “micrograms” are commonly used when reporting stack gas concentrations of trace gases, such as PCBs and dioxins. There are 1,000,000 micrograms in a gram, and there are 1,000,000,000 nanograms in a gram.

#### Units used when reporting mass emission rates

lb/hour = pounds per hour

lb/day = pounds per day

µg/second = micrograms per second

ng/second = nanograms per second

Note: The most appropriate unit of measurement for mass emission rates is often based on reporting convention and regulatory requirements. Some regulations, for instance, require facility operators to report maximum hourly emission rates; in such cases, pounds per hour might be an acceptable unit of measurement. The pollutants also determine what units are most appropriate. Pollutants present in very trace amounts (e.g., dioxins) often are reported in terms of micrograms or nanograms.

## Appendix G: Responses to Public Comments

On March 1, 2005, the Agency for Toxic Substances and Disease Registry (ATSDR) issued the Public Comment Release of the public health assessment for the TSCA Incinerator. The Public Comment Release was distributed directly to numerous individuals and local organizations. Additionally, ATSDR issued a press release announcing the availability of the Public Comment Release at local records repositories. The public comment period lasted nearly 12 weeks and ended on May 20, 2005. During the public comment period, ATSDR also coordinated a peer review of the public health assessment, which was conducted by four independent scientists.

This appendix presents the comments that the public, local organizations, and peer reviewers submitted during the public comment period, along with ATSDR's responses to those comments. Note that all page numbers cited in this appendix refer to page numbers in the Public Comment Release draft. The list of comments below does not include editorial comments, such as suggested word changes and spelling corrections.

Public or Peer Reviewer Comment		ATSDR's Response
General Comments		
1	The document is well written and, in large measure, should be comprehensible to the lay public. This is partly borne out by the sparse amount of comments that have been made by members of the Exposure Evaluation Work Group and the ORRHES.	ATSDR appreciates receiving these comments. No changes were made in the PHA in response to these comments.
2	The report was very well prepared; the sources of information, reliability of data, and assumptions were well documented.	
3	This is a very comprehensive and well-prepared document. This reviewer has rarely seen such accurate and clear communications of the health threats. Comments that are offered are of minor significance.	
4	The report is unusually thorough and well written.	
5	Overall a very well written report.	
Comments on Specific Topics or Minor Clarifications		
6	As can be noted in the acknowledgments of the Environmental Radiation Ambient Monitoring System (ERAMS) quarterly data reports, ( <a href="http://www.epa.gov/nare1/ERD11.pdf">http://www.epa.gov/nare1/ERD11.pdf</a> ), U.S. Environmental Protection Agency (EPA) doesn't actually perform the sampling at the ERAMS stations, but relies on other agencies and volunteers to perform the sampling. On the reservation, TDEC employees collect the samples and maintain the equipment. The U.S. Department of Energy (DOE) provides the power necessary to run the equipment. For the Oak Ridge program, EPA agreed to provide multiple air stations (five), which were placed at locations submitted by TDEC for EPA approval. Samples are collected from these stations by TDEC staff twice weekly (or at the request of EPA), scanned using a GM scaler, and then mailed to EPA's National Air and Radiation Environmental Laboratory (NAREL) for analysis.	ATSDR revised the description of the ERAMS monitoring program (see Appendix C.2) to clarify that TDEC employees collect the samples which are then analyzed in an EPA laboratory.

Public or Peer Reviewer Comment		ATSDR's Response
7	Page 52, Lines 35-38 (also Page 53, Lines 1-2, Page 58, Lines 20-22, Appendix C): In addition to DOE's monitoring efforts, EPA has continuously sampled air for radionuclides at ETTP, but this sampling did not commence until 1996. EPA's sampling device is installed at DOE's K-2 station (see Figure 10), approximately 3/4-mile from one of DOE's perimeter monitoring stations.	ATSDR revised these passages to clarify that TDEC collected the samples in the ERAMS network, and EPA analyzed the samples.
8	Amount of waste treated (see Figure 5), pages 14-16 - This section implies that the incinerator is operating much below its capacity. Please revise the section to clarify that other permit conditions for specific contaminants and parameters in the feed would cause the allowable waste feed rate to be lower than just the limit on liquid and solid mass throughput.	This clarification has been added to "amount of waste treated" in Section II.B.
9	Page 17, line 1; see also page 45, line 1 and page 54, line 5 – The description of thermal relief vent (TRV) opening events is not complete; please expand so it is clear that they have an insignificant effect on air emissions.	None of the reports that ATSDR reviewed present measured or estimated emission rates from the TRV events. Therefore, ATSDR has no basis for concluding that these events have an "insignificant effect" on air emissions. However, ATSDR revised several passages in the PHA to emphasize that the TRV events are extremely short-lived, as are their associated air quality impacts. ATSDR made additional revisions to the text on TRV events in response to Comment #40.
10	The context of "other local emissions" (page 24 line 39 and page 29, line 9) should be brought forward into the Summary as a context statement.	This context has been added under the header "Air emissions from the TSCA Incinerator" in Section I.
11	June 1988 Resource Conservation and Recovery Act (RCRA) Trial Burn (Engineering-Science 1988b), Page A-5, Lines 14-16 - The report states that an additional trial burn was conducted one year later to better establish permitting limits on key operating conditions. The retest was in fact required after TDEC ruled the initial test report inconclusive. The reasons that the test report was ruled inconclusive were because some samples were broken in transit to the laboratory and others were not analyzed properly or exceeded the allowed holding time before being analyzed. All samples that were correctly analyzed were within the required performance standards.	ATSDR has received conflicting accounts for why the 1988 test report was ruled inconclusive. We have included both accounts in Appendix A-1. These conflicting accounts do not affect the overall interpretations of the 1988 test report, because regulators required a subsequent trial burn to demonstrate the incinerator's effectiveness before routine operations could commence.
12	Performance Tests, Section A-2 - A new permit issued January 25, 2005, revises the TDEC Permitted Emission Limits. Most of the revised limits reflect application of Maximum Achievable Control Technology standards for pollutants with limits under that regulation. Sulfur dioxide and hydrogen fluoride are unchanged. Beryllium is increased from 0.002 lb/day to 0.02 lb/day.	ATSDR added information to Table A-2 about the changes to permitted emission limits that are identified in this comment.

Public or Peer Reviewer Comment		ATSDR's Response
13	P. 10. This section should give some description of the composition of the feedstock (instead of on p. 14), what happens chemically in the incinerator, and the composition of the incinerator effluents (e.g., water, carbon and nitrogen oxides, chloro compounds, etc.). Also, the fate of the noxious effluents should be addressed more completely here (it is partially covered on p.12).	ATSDR has made several minor changes to Section II.A.2 in response to this comment. First, under "Waste Handling," the section now gives further detail on the composition of the feedstock, as characterized by annual incinerator "rolling totals" reports. Second, under "Incineration," there is additional text explaining what happens to different substances after they enter the incinerator. Third, under "Air Pollution Controls" and "Residuals Management," further information is included on the fate of different effluents.
14	P. 10. State that the ventilated table on which repackaging occurs is ventilated through a filtration system that prevents particulates and noxious gases from entering the atmosphere (if this is indeed correct).	ATSDR added this information under "Waste Handling" in Section II.A.2.
15	P. 12 (and P. 22). The stack of the TSCA incinerator is 100 feet high. The parallel, bounding ridges are 200 feet high, twice as high as the incinerator stack. Has this been considered in the dispersion calculations? How does this affect dispersion?	Terrain features are significant because they influence surface-level prevailing wind patterns. This information has been added to Section II.D. ATSDR has updated Appendix B to explain that the dispersion modeling analyses represented complex terrain features using a technique called "flagpole receptors." For various reasons specified in Appendix B, ATSDR still believes the dispersion modeling analyses reviewed in the PHA tend to overstate, and not understate, the actual exposure concentrations that residents might have experienced.
16	P. 22 (and Fig. 6). Describe the Wind Rose in greater detail and clarity. For example, note that the circular grid lines represent the percent of time that the wind blows in a particular direction, and that the wind direction is from the end of the bar towards the center of the Wind Rose. Also, reword the sentence on p. 22 to something like "As Fig. 6 depicts, the prevailing wind patterns near the TSCA incinerator are from the <i>general southwest direction (i.e., WSW, SW, and SSW) toward the northeast and, to a lesser extent, from the general northeast direction toward the southwest.</i> "	ATSDR added this information under "Climate and prevailing wind patterns" in Section II.D and in Figure 6.

Public or Peer Reviewer Comment		ATSDR's Response
17	P. 30. Have you sought input from the Knox County Health Department in your presentation of the air quality of the Greater Knoxville area? This certainly would demonstrate a desire to work openly with a broad range of stakeholders.	The Knox County Air Quality Management Division conducts various activities to characterize general air quality in the Greater Knoxville Area. ATSDR has provided the Air Quality Management Division a copy of the PHA. TDEC has informed ATSDR that it, in coordination with the Air Quality Management Division, would continue to issue warnings about poor air quality, as needed. ATSDR will provide the Knox County Health Department a copy of the PHA as well.
18	P. 31. Have incinerator campaigns been conducted during periods of high pollen concentration? If so, what effect would this have on the dispersion of airborne material?	ATSDR's findings in this PHA are based largely on ambient air sampling data and ambient air monitoring data that are collected throughout the year. Thus, any influences of seasonal effects, whether due to temperature, higher pollen counts, or other factors, were implicitly considered when evaluating these monitoring data.
19	P. 39. Refer the reader to the definition of "Comparison Value" on p. E-2 in the appropriate paragraph. Also, the definition of CV needs to be more specific. Is it wrong to state that the CV is intended to be lower than the lowest value known to be associated with adverse health effects by at least (a stated factor) of safety?	ATSDR revised a paragraph in Section III.A to refer to the Glossary (as requested) and to include the additional perspective on comparison values noted in the comment.
20	P. 52 (and P. C-14). Despite the difference in the limits of detection of the analytical methods used by TDEC and DOE, the TDEC monitoring data should be considered when selecting contaminants for further consideration. For beryllium, for example, the TDEC value is equal to the comparison value. Also, is limit of detection actually intended, as opposed to precision (i.e., the number of significant figures to which the results may be determined)?	ATSDR considered all ambient air sampling data and ambient air monitoring data when selecting contaminants for further consideration. Any contaminant with a concentration <i>greater than</i> its corresponding comparison value was selected. The highest concentration of beryllium was not <i>greater than</i> its comparison value. More precise wording has been used in Section V.A (Question 5) in response to this comment. More detailed evaluation of beryllium is not warranted by the fact that a single measured concentration was equal to the highly protective comparison value.

Public or Peer Reviewer Comment		ATSDR's Response
21	P. 52 (and Pp. 53 and 58). There appear to be several instances in which the terms “sampling” and “monitoring” are used interchangeably. “Sampling” implies selecting a portion of the whole for analysis, whereas “monitoring” implies continuously measuring the whole. Also, the terms “continuous sampling” and “sampling continuously” are misleading, and should be replaced with “frequent sampling” or “samples taken at regular intervals.”	ATSDR was sensitive to the differences between “sampling” and “monitoring” when preparing this PHA (e.g., see the text box in Section III.D). A difficulty in distinguishing these terms is that various parties have different concepts of “monitoring.” For instance, EPA would typically consider a program that collects particulate samples every 7 days to be an “ambient air monitoring program,” while the comment implies that such a program is better classified as “sampling.” ATSDR reviewed the text on the pages noted and revised wording, as appropriate.
22	P. 54. If possible, indicate wind speed and direction at the times of the TRV events.	ATSDR does not have information on the wind speed and direction during every TRV event. However, it is important to note that DOE collects air samples at the two locations that separate the TSCA Incinerator from the nearest residents. Thus, the samples collected during these events likely provide an upper-bound estimate of the short-term exposures that might have occurred at the nearest residential locations. ATSDR has added this observation to Section III.D.2.
23	P.59 (and Pp. 61, 62, and 64). Attributing a difference between calculated and measured concentrations to one or more causes requires explicit consideration of the accuracy of the calculations. This is particularly true of air-dispersion calculations, so that the perceived five-fold difference may very well be within the uncertainty of the calculation, although the occurrence of sources other than the TSCA incinerator is also a plausible contributing factor.	ATSDR revised the text on arsenic to acknowledge the possible explanations for why model predictions differed from air quality measurements. In the case of cadmium and chromium, uncertainty in the modeling alone likely does not account for the more than 15-fold difference between the measured and modeled concentrations.
24	P. 66. Lines 21 – 26 indicate that several reports that are identified are available for reading in the ATSDR Oak Ridge Field Office. Is this correct?	The Oak Ridge Field Office is no longer open, but complete references are included in the text for the specific documents of concern.

Public or Peer Reviewer Comment		ATSDR's Response
25	Pp. B-2 to B-3. It would be helpful to list the quantities required as input to the ISCST code, and to discuss the uncertainties associated with each one. Also, it would be helpful to cite the EPA User Manual for the ISCST code for those who might wish to pursue this facet further. The EPA User Manual is available on line at <a href="http://www.epa.gov/ttn/scram/userg/regmod/isc3v2.pdf">http://www.epa.gov/ttn/scram/userg/regmod/isc3v2.pdf</a> .	Information on the inputs and assumptions inherent in the Independent Panel's modeling analysis is documented on pages 67 to 82 of the panel's summary report (Iglar et al. 1998). ATSDR added text to Appendix B.1 that refers readers to those specific pages, as well as the ISCST User Manual, should any reader want to look further into the modeling analyses.
26	P. B-2. Consider providing a set of maps depicting contours of calculated ground level concentrations of contaminants of concern. This might help in providing a visual description of the effects of wind-rose data, stack height, and topography.	The maps suggested in the comment are included on pages 74 to 78 of the independent panel's summary report (Iglar et al. 1998). These maps clearly show maximum ground level air quality impacts consistent with the prevailing wind patterns. What is more important, in ATSDR's opinion, is that the estimated air quality impacts are all safely below levels expected to cause adverse health effects — a message that is more appropriately and easily reported in the text.
27	P. B-5. The EPA Clean Air Assessment (CAP-88) document does not appear to be cited in the list of references. It is available on-line at <a href="http://www.epa.gov/radiation/assessment/CAP88/">www.epa.gov/radiation/assessment/CAP88/</a> .	A reference to the CAP-88 User's Guide and the website included in the comment have been added to Appendix B.2.
28	The magnitude of emissions was clearly stated. The PHA provides a detailed account of the emissions from the TSCA Incinerator. The PHA clearly describes the wastes being handled, the incineration system used for its disposal, the pathways for release of emissions, the topography and wind patterns, the surrounding population density, alternative pollution sources in the area, and the methodologies used in the PHA. This information is utilized to determine the nature and extent of contamination using both dispersion modeling and monitoring networks.	ATSDR appreciates receiving this comment. No changes to the PHA are needed in response.
29	P. B-9. Is the report (EPA 1998) available at the DOE Information Center?	The particular reference of concern mentioned in this comment is available online from EPA's web page. That link has been added to the list of References in Section XII.

Public or Peer Reviewer Comment		ATSDR's Response
30	The PHA provided two approaches to the assessment of exposure: (1) By the use of dispersion modeling to calculate the concentration at the position of maximum exposure. The calculations provide a conservative estimate of exposure. The position of maximum concentration is within the ETTP so that local populations at off-site locations will be exposed to lower concentrations. The calculations were based on the maximum allowed feed rate, even though average waste treatment rates are much lower. (2) From ambient monitors. These ambient monitors provide a conservative estimate of the contributions to exposure by the TSCA Incinerator since other sources contribute to the ambient concentrations of pollutants. The concentrations of pollutants were found to be, with few exceptions, well below those necessary to safeguard public health.	ATSDR appreciates receiving this comment. No changes to the PHA are needed in response.
31	P. B-7. Knowing that air dispersion calculations do not yield precise values because of theoretical and empirical limitations on the calculations as well as uncertainties associated with the input parameters, it would nonetheless be instructive to compare the calculated ground-level concentrations with reliable measured values for particulate matter, radionuclides, and metals, where the latter are available, instead of dismissing the calculations completely.	ATSDR conducted its modeling evaluation to fill important information gaps left by the other available studies. ATSDR judged that the available data on emissions, dispersion modeling, and ambient air sampling were more than sufficient for reaching conclusions on particulate matter, radionuclides, and metals. Therefore, ATSDR decided not to devote additional resources to modeling these groups of contaminants. ATSDR has added text to Appendix B.3 to clarify its justification for not doing this additional modeling.
32	P. B-7. It is not obvious that the same dispersion factor can be used for all of the contaminants that have been examined. Justification of this assumption is required.	Use of a single dispersion factor in ATSDR's calculations essentially assumes that all pollutants remain airborne and do not have decaying concentrations due to mechanisms or deposition or reaction. By not accounting for these mechanisms, the dispersion factor actually leads to an upper-bound estimate of actual ambient air concentrations for all pollutants. ATSDR added a paragraph in Appendix B.3 to justify the use of a single dispersion factor for multiple pollutants.
33	P. B-8 (and C-6). The statement that dioxins and furans are the air contaminants of greatest concern for incineration facilities seems to contradict the statement on P. C-6, based on Table C-2, that the maximum annual measured air concentrations at ground level of arsenic, cadmium, and chromium exceeded their respective comparison values.	On page B-8 of the Public Comment Release, ATSDR refers to dioxins and furans as "arguably" being the contaminants of greatest concern for incineration facilities. While this statement is supported by prominent reviews of incineration facilities (e.g., NRC 2000), ATSDR removed the statement from page B-8 to respond to concerns raised in this comment.

Public or Peer Reviewer Comment		ATSDR's Response
34	The lead emissions from prior tests are noted (on page A-13) to have been in some cases higher than the MACT standards. Therefore, I would suggest that statements be made regarding whether this incinerator will be subject to the MACT standards in the future, and, if so, what will be done differently to ensure that lead emissions are within the MACT standards.	The TSCA Incinerator is subject to EPA's MACT standards. However, one cannot infer from Table A-4 that emissions of lead exceeded these standards. Rather, looking more broadly at Appendix A, the emissions data for lead quite clearly were routinely lower than permitted emission limits. Also, considering Appendixes B and C, all modeled and measured ambient air concentrations of lead near the TSCA Incinerator were considerably lower than EPA's health-based air quality standards. For these reasons, ATSDR does not believe any revisions to the PHA are needed to clarify the conclusions for lead.
35	The PHA evaluates exposures to "eight groups of contaminants" measured in various stack tests and trial burns conducted on the ORR TSCA Incinerator (page 3, lines 4 to 11). Three of the eight groups of contaminants represent semi-volatile organic compound groups. While the three semi-volatile groups included in the PHA are likely to represent those semi-volatile compounds of greatest concern with respect to toxicity and/or carcinogenicity, the PHA would benefit in terms of completeness from a brief discussion of which other semi-volatile compounds are present in the facility emissions and to what extent those compounds contribute to the overall risk.	ATSDR agrees with the statement in the comment that the PHA focuses on the semi-volatile compounds of greatest concern with respect to toxicity and carcinogenicity. ATSDR has added a note to Table 6 acknowledging that other semi-volatile organic compounds are also emitted, but waste composition data suggest that the quantities emitted are likely immeasurably small.
36	One additional point of some confusion may be the comparison of TRI reported data. As TRI data is not limited to air emissions via dedicated point sources, the lay reader may not fully appreciate the relevance of the extreme differences represented in the table of Answer B-2 (page 68).	ATSDR included the TRI data in response to a public comment. Aware of the many limitations associated with TRI data, ATSDR included several cautionary statements in the PHA to avoid potential misinterpretations. The text in question was revised slightly to emphasize the importance of interpreting TRI data in proper context.

Public or Peer Reviewer Comment	ATSDR's Response
<p>37 To the extent the PHA relies on the limited ISCST3 modeling by the Independent Panel for the assessment of direct exposures, ATSDR provides appropriate qualifications and limitations for its conclusions (Page B-2 and B-3). However, at such time ATSDR begins its assessment of indirect risk, the air dispersion modeling should incorporate wet and dry deposition effects, mass versus area particulate partitioning (for metals and semi-volatile organics), and plume depletion.</p>	<p>Given the considerable uncertainties associated with modeling atmospheric deposition and subsequent accumulation of contaminants in food chains, ATSDR has no plans for conducting any further dispersion modeling. Rather, the extent to which emissions from the TSCA Incinerator might be found in environmental media besides air is being addressed in ATSDR's Public Health Assessment of Current and Future Chemical Exposures in the Vicinity of the Oak Ridge Reservation (see responses to Comments #49, 50, and 51).</p>
<p>38 It is well known that emission from rotary kilns are prone to occur in puffs, during upset conditions and during the periodic feed of solids. The solids are fed in combustible containers. Other industries and EPA have found the amount of solids that can be fed in such containers is limited by the rate of volatile release. Insufficient information was provided to determine if the volatile release after the container was injected could exceed the air supply providing a transient release (puff).</p>	<p>While it is possible that certain feed conditions could lead to "puffs" of volatile compounds passing through the rotary kiln, the incinerator permit requires that gases take at least 2 seconds to pass through the afterburner. This requirement, which must be continuously monitored, along with other waste handling requirements for solids is expected to dramatically dampen any transient increases in emission rates.</p>
<p>39 Oxygen combustion is very different from air combustion. Oxygen on page 7 and Figure 3 (page 9) should be replaced with air to avoid any confusion.</p>	<p>ATSDR revised the text accordingly.</p>
<p>40 The discussion of the TRV releases is not up to the quality of the rest of the report. It should be noted that the changes in emission rate will vary greatly with pollutant category. The extremes are: (1) There is no change in Hg emissions when the TRV is open (all the Hg is emitted with or without the TRV open). (2) There is an increase by over a factor of 1,000 in HCl when the TRV opens [from a capture efficiency of 99.912% see page A-5 to 0% capture with the TRV open]. Others pollutants fall in between. The discussion on page 57 implies that the measurements of PCBs when the TRV was open is representative of changes for other pollutants but the ratio of emissions for PCBs is not a good measure of those of other contaminants. The ratio of emissions also provides only a measure of acute effects. For chronic effects the duration of the openings of the TRV are needed in order to compare the cumulative emissions during the 18 episodes relative to the aggregated during normal operation. (Note that although the waste feed is cut off the contents of the kiln will continue to burn during such incidents). The data on the radionuclides are aggregate values that include the TRV events and provide the best measure of the aggregate emissions. Note, however, extrapolation to other pollutants must be qualified for the change in the emission rates discussed above.</p>	<p>ATSDR revised text in Section III.D.2 to provide additional information on how air emissions during TRV events differ from air emissions during routine operations. The comment does not question ATSDR's findings for dioxins, furans, PCBs, or radionuclides. The main issue raised is whether the TRV events might cause elevated air quality impacts for pollutants largely removed by the air pollution controls, namely hydrochloric acid. ATSDR has added a paragraph to Section III.D.2 acknowledging the limitations of the existing data and providing arguments why anticipated exposure levels to hydrochloric acid during TRV events are not expected to reach levels of health concern.</p>

Public or Peer Reviewer Comment		ATSDR's Response
41	Page 45, Lines 19 to 27: The fact that samples are collected during all TRV events needs qualification based on analysis decision criteria.	ATSDR clarified in this particular section, as was qualified elsewhere in the PHA, that only a subset of samples collected during TRV events are currently being analyzed.
42	P. 60 (and P. B-4). ATSDR should employ a consistent terminology for health effect concentration limits. In the PHA for uranium releases from Y-12, the term “lowest observed adverse effect level” (LOAEL) is used. The non-cancer LOAEL is approximately 0.7 micrograms per cubic meter, and the cancer-related LOAEL is 50 micrograms per cubic meter. In Table B-1 on p. B-4, the comparison value for arsenic is given as $2 \times 10^{-4}$ micrograms per cubic meter. This value is lower than the non-cancer LOAEL by a factor of 250,000. The definition of LOAEL should be given, as well as the relationship between LOAEL and CV, if only for the sake of consistency.	In the initial screening for contaminants requiring further evaluation, ATSDR uses comparison values. Some comparison values have been established for non-cancer effects (e.g., EMEGs); others have been established for cancer effects (e.g., CREGs). For all contaminants having concentrations greater than health-based comparison values, regardless of the type of comparison value, ATSDR examined exposures more thoroughly. For non-cancer effects, exposure concentrations are compared against lowest observed adverse effect levels (LOAELs); and for cancer effects, exposure concentrations are compared against cancer effect levels (CELs). This approach is consistent with ATSDR guidance for conducting PHAs. ATSDR has added the definition of LOAEL to Section IV, as requested.
43	Pp. 60 – 63 (and Pp. B-4 and D-1). The comparison values for arsenic, cadmium, and chromium are 1,250 to 500,000-times smaller than the corresponding LOAEL values. Why are the differences so large, and so variable? And what is the relationship of both the LOAEL and the CV to the CREG, that is defined on P. D-1?	As Table B-1 notes, the comparison values for arsenic, cadmium, and chromium are Cancer Risk Evaluation Guides. These comparison values are derived from Unit Risk Factors that EPA has published in its Integrated Risk Information System (IRIS); they are not computed directly from LOAELs for non-cancer effects, as the comment suggests.

Public or Peer Reviewer Comment	ATSDR's Response
<p>44 P. C-13. The statement that only arsenic and chromium had at least one measured concentration greater than their health-based comparison values is not exactly correct, as Table C-5 indicates that the highest measured value of beryllium was equal to its CV. Also, it would be helpful to include the uncertainties associated with these measured values.</p>	<p>The statement noted is correct. As the comment itself notes, beryllium did not have any concentrations <i>greater than</i> its corresponding health-based comparison value; rather, the highest concentration was equal to the health-based comparison value. More detailed evaluation of beryllium is not warranted by the fact that a single measured concentration was equal to the highly protective comparison value. ATSDR agrees that information on the uncertainty associated with measurements would be helpful, but such information is not presented in any of the original reports. ATSDR notes that the laboratory analytical methods commonly used for identifying metals on particulate filters can usually achieve a measurement precision of better than 10% (EPA 1999).</p>
<p>45 There are four sets of parameters that are pertinent to this report for arsenic, cadmium, chromium, and beryllium. They are the CV numbers, calculated concentrations, LOAEL values, and measured maximum and long-term concentrations. A table that allows a comparison to be made of the four sets of values would be most instructive. [A handwritten table was provided as an example.]</p>	<p>ATSDR appreciates the desire to conduct data evaluations in a uniform manner. The Public Comment Release draft tried to achieve this as follows: (1) for every contaminant, the highest concentration was first compared to the most protective comparison value (whether derived for non-cancer or cancer effects); and (2) for the three contaminants selected for further evaluation, detailed evaluations were presented first for non-cancer effects and then for cancer effects. ATSDR has revised the opening statements in Section IV to emphasize that separate evaluations are presented for non-cancer effects and cancer effects. ATSDR is not including a single table as the comment suggests, because the proposed table mixed information on the non-cancer and cancer evaluations, which are routinely conducted separately for contaminants requiring further assessment.</p>

Public or Peer Reviewer Comment	ATSDR's Response
<p>46 The communication of the risks posed by the incinerator is the area of greatest concern in this report; in particular, the frequent use of the term “contamination,” “contaminants,” “harm,” etc. “Contamination” undeniably conveys the notion of real, not potential, harm. This problem may have its origin in the somewhat contradictory definition of contaminant included in the glossary: “A substance that is either present in the environment where it does not belong, or is present at levels that might cause harmful (adverse) health effects.” If you were a lay audience member reading this report, which definition would <i>you</i> believe? How would you distinguish between the two? I would respectfully suggest a lay audience should not be asked to do so, which is why this double-meaning is confusing. A reader would be understandably confused by hearing mixed messages of “contaminants” being released that cause no harm, and this confusion hinders public understanding and acceptance of the findings. This could be clarified by finding two different words or phrases that accurately describe each concept, rather than relying on one emotive word such as “contamination” to fill several roles. Is there a term that more accurately conveys the concept of potential risk, such as compounds of concern? Compounds of interest? It would be advisable to find a term that more accurately conveys the level of risk (not harm) posed by these compounds and use that term throughout the report. See also this very question #4 [in the charge to the peer reviewers], referring to the “health threat posed by the site.” If the conclusion of the report is that there is no health threat, is there a more accurate way to phrase this question that does not somehow imply that there is a health threat? Given the conclusion of lack of any threat to health from this incinerator, the report should be worded in a way that accurately conveys that conclusion without increasing perception of risk simply by choice of words.</p>	<p>The comment questions the use of the term “contaminant” throughout the PHA. The comment states that using the term “contaminant” might give the impression that harmful exposures are occurring, even in cases when they are not. ATSDR is quite sensitive to the connotations of terms used in its documents. However, one can just as well argue that using “less threatening” terminology (like “substance” or “compound of interest”) might give the impression that ATSDR is downplaying the potential dangers of some highly toxic chemicals (e.g., arsenic, dioxin). After carefully considering this comment and noting that none of the many other reviewers of this document have raised similar concerns, ATSDR will not be replacing the term “contaminant” as suggested.</p>
<b>Comments on Methodologies Used in the PHA</b>	
<p>47 ATSDR's ORR TSCA Incinerator PHA employs current and appropriate methodologies to adequately describe the nature and extent of potential risks associated with direct exposure (via inhalation) to facility emissions.</p>	<p>ATSDR appreciates receiving this comment. No changes to the PHA are needed in response.</p>
<p>48 This Peer Review question appears to conflate data (the information available for assessment) with methods (the manner in which information is assessed). Notwithstanding this possible point of confusion, this review is unable to address the appropriateness of data use absent a presentation of such data and any methodological manipulations. However, the document does present a reasonably detailed description of assessment methods. The assessment methods described appear to have been properly used in arriving at the conclusions presented.</p>	<p>ATSDR appreciates receiving this comment. No changes to the PHA are needed in response.</p>
<p>49 ATSDR's ORR TSCA Incinerator PHA description of potential pathways of human exposure would benefit from a more thorough explanation of the different pathways of human exposure and that this PHA focuses on the direct exposure route. This expanded discussion should be highlighted in the Summary section to provide readers a clear and early indication of the PHA's focus and limitations.</p>	<p>ATSDR added two sentences to the Summary (Section I) to indicate that the primary focus of the PHA is indeed on direct inhalation exposures and to acknowledge that indirect exposures will be considered further in a future PHA.</p>

Public or Peer Reviewer Comment	ATSDR's Response
<p>50 Some may question why additional pathways were not addressed in more detail, but understanding that airborne exposure poses the greatest risk at this site, I am not concerned by the lack of additional analysis of secondary pathways as you have shown the airborne risks to be quite low.</p>	<p>ATSDR has more prominently acknowledged in the Summary that the PHA focuses almost entirely on direct (inhalation) exposures. The possibility of indirect exposures is being considered in a subsequent PHA, though all indications from the air monitoring data suggest that such indirect exposures are likely insignificant — a finding echoed by two of the peer reviewers (see Comments #50 and 51).</p>
<p>51 Only air emissions are of concern since water and solid discharge passes through ORR's waste treatment and disposal systems which are monitored to ensure that they do not lead to public exposure. Air emissions are used to evaluate air exposure. However, air emissions can enter the food chain through soil deposition and transport to aqueous media. This was clearly recognized in the treatment of the radionuclides discussed on page B-5 and in the response to Question B-3 on page 69. Alternative exposure pathways clearly cannot be excluded a priori. However, if the TSCA Incinerator contributes a negligible fraction of the air concentration, it follows that air emissions would similarly contribute a small fraction of the exposure through alternative pathways that result from deposition of air emissions. This issue should have been addressed up front and not in a response to a question on page 69.</p>	<p>ATSDR's revision to the Summary (see responses to the two previous comments) addresses the issue raised in this comment. As this comment and the previous comment note, the available data suggest that indirect exposure pathways are likely insignificant for the TSCA Incinerator.</p>
<p>52 The data and methods were correctly applied. However, in the "Overall Findings" in Table 8, metals, it would not be correct to conclude "chromium was selected as a contaminant of concern" or in Table 9 and page 57 that "arsenic, cadmium and chromium require more detailed evaluation." If they required more detailed evaluation or were of concern beyond initial evaluation, it is only because they were not correctly evaluated at the outset (i.e., they were evaluated assuming 100% of each metal was emitted in its most toxic form without justification for assuming so based on speciation of emitted metals, as noted for chromium on page B-4 and C-8) and/or that other sources of exposure to these metals were included in the evaluation of the incinerator (as noted on page 59) instead of quantifying the exposure to the incinerator relative to other sources. As a result, Section IV on Public Health Implications goes into considerably more additional detailed evaluation than warranted by the data.</p>	<p>The comment addresses the methodology ATSDR used to select contaminants requiring further evaluation and suggests that ATSDR should have selected fewer (rather than more) contaminants requiring further evaluation. During chemical screening, ATSDR first compares the highest concentrations to conservative health-based comparison values. In some instances (e.g., chromium), assumptions must be made regarding the form of the contaminant present. All such assumptions were fully documented in this PHA. The net result is that this screening process intentionally errs on the side of being more health-protective, which ATSDR believes is entirely appropriate for a screening procedure. Accordingly, no changes were made in response to this comment.</p>

Public or Peer Reviewer Comment	ATSDR's Response
<p>53 You may want to check the source of the DOE data presented in Table C-2 on page C-8 to be sure the data are being presented accurately. It does not seem likely that CREGs would be exceeded for arsenic, cadmium and chromium unless some significant assumptions were made about the form of each metal present when it was compared to the CREG, such as assuming each metal was present in 100% carcinogenic form which is highly unlikely. If such assumptions were made, those should be stated here and the justifications for them, as they seem to form the entire basis of the additional evaluation for those three metals (according to page C-6, line 20). The same thought applies to TDEC monitoring data in Table C-5 on page C-14. Any assumptions with regard to the original speciation of the monitored data that were compared to CREGs should be clearly stated and the justification for doing so before submitting these compounds to further evaluation that may not warrant it.</p>	<p>The comment asks ATSDR to double-check the data summaries presented throughout Appendix C. ATSDR has verified that the data tables are indeed correct. The comment suggests that ATSDR made “significant assumptions” when finding that ambient air concentrations exceeded the CREG. While this is true for chromium (and the assumption that the chromium is present entirely as the hexavalent form is documented in the PHA), no such assumptions were made for arsenic or cadmium. The fact that the ambient air concentrations exceeded the CREG primarily reflects the very conservative nature of the comparison values for cancer outcomes. More importantly, however, the detailed evaluations in Section IV of the PHA showed (1) that ambient air concentrations of arsenic, cadmium, and chromium near the TSCA Incinerator are reasonably consistent with those measured in rural and suburban areas around the country and (2) that measured concentrations are at levels well below those observed to be associated with adverse health effects.</p>
<p>54 Much of the health assessment is based on ambient monitoring data. However, the report does not provide a basis for estimating the fraction of the concentrations at the monitoring sites that are contributed by the TSCA Incinerator. Determination of the fraction is possible, in principle, using source apportionment techniques, taking advantage of the fact that radionuclides can serve as a source signature for the TSCA incinerator. There may be other contributors of the radionuclides at ORR but the radionuclides should provide a basis for eliminating the background contaminants that are from off-site sources. The ratio of contaminants such as cadmium to the radionuclides in the filters from the stack of the TSCA Incinerator compared to those from ambient samples should provide a means of eliminating the grossly conservative assumption that the ambient concentration is due to emissions from only the TSCA Incinerator. An opportunity seems to have been missed to use the unique signatures present in the wastes to better resolve the air monitoring results. It is particularly important to provide this fraction as the potential health consequences of cadmium, arsenic, and chromium.</p>	<p>ATSDR entirely agrees that conducting sophisticated source apportionment studies would provide even greater insights into the ambient air monitoring data collected near the TSCA Incinerator. When conducting this PHA, however, ATSDR's initial goal was to evaluate the public health implications of the measured concentrations, regardless of their origin. Given that the measured concentrations were found to be safely below levels associated with adverse health effects, ATSDR does not feel compelled to invest additional resources in source apportionment studies, though such studies might generate interesting and informative results. Accordingly, no changes to the PHA are needed in response to this comment.</p>

Public or Peer Reviewer Comment		ATSDR's Response
55	With the reindustrialization of portions of East Tennessee Technology Park (ETTP) and leasing of buildings to private businesses, there has been an influx of workers employed by businesses not directly associated with DOE operations. As a consequence, it would appear that employees of the lessees would be the most exposed members of the public. Were the exposures to these workers given consideration in Agency for Toxic Substances and Disease Registry (ATSDR) evaluations?	When preparing this PHA, ATSDR did consider exposure to workers not directly associated with DOE operations. This was done in two ways. First, ATSDR noted that the highest concentrations predicted in the Independent Panel's modeling study occurred at locations within and immediately adjacent to ETTP, where occupational exposures could potentially be occurring for the workers noted in this comment. Given that the estimated concentrations from the Independent Panel study were below levels of health concern, under the assumption of continuous residential exposure scenario, it follows that the estimated concentrations are also safe for an occupational exposure scenario. Second, several of the ambient air monitoring stations considered in this PHA (e.g., see Figures C-2 through C-4) were placed either within the ETTP site boundary or in locations believed to experience the greatest air quality impacts. None of the measurements ATSDR reviewed reached levels of health concern, including measurements collected at locations that only workers might frequently access.

Public or Peer Reviewer Comment		ATSDR's Response
56	<p>ATSDR has identified that ambient air concentrations of arsenic, cadmium, and chromium are present at concentrations above their health-based comparison values. Is there any indication that these air contaminants are due to the TSCA Incinerator? If not, is this discussion relevant to this PHA? The same ambient air monitoring results are reported annually by DOE and TDEC; however they have not come to the same conclusions because these agencies use different guidelines (e.g., risk-specific doses from 40 CFR Part 266). DOE, TDEC, and ATSDR should resolve the appropriate comparison standard for the data. The lead sentences discussing the results for arsenic (page 59, line 41-44), cadmium (page 61, line 2-5) and chromium (page 62, line 26-29) should be reworded so that they cannot be quoted out of context to give a meaning opposite that intended by ATSDR. These statements (without context) give the impression that the metals were of concern to public health. The paragraphs containing these statements should also cite references to the comparison values used and describe their nature, i.e. conservative or otherwise. The new statements should make the reader immediately aware of any assumptions leading to different conclusions. The discussion should clearly distinguish between the use of screening values and final decision values.</p>	<p>The comment raises several issues. First, the comment asks the extent to which ambient air concentrations of arsenic, cadmium, and chromium result from the TSCA Incinerator's air emissions. In Section IV.D of the PHA, ATSDR addressed this issue in a general fashion by noting that: "For all three metals, the available sampling and modeling data suggest that emissions from multiple local sources, and not just the TSCA Incinerator, contribute to the measured airborne concentrations." Second, the comment questions why the PHA discusses these contaminants if the ambient air concentrations are not "due to the TSCA Incinerator." When evaluating air quality issues, ATSDR routinely presents ambient air sampling and ambient air monitoring data collected at locations near the source of interest. Omitting these data from the PHA would be a very serious oversight. Third, the comment requests further information in Sections IV.A, IV.B, and IV.C to ensure that certain statements cannot be taken out of context. ATSDR has revised the specific passages mentioned in the comment in attempt to help ensure that the data summaries cannot be misinterpreted. Finally, the comment correctly notes that different agencies use different guidelines to evaluate ambient air monitoring data. Although this reality might be somewhat confusing, ATSDR encourages readers to appreciate the consistency of the overall message. While the agencies involved in this site use various and different guidelines to evaluate ambient air monitoring data, the different agencies' interpretations converge on the same conclusion: the air emissions from the TSCA Incinerator do not cause exposures at levels of health concern.</p>
<b>Comments on the PHA's Conclusions and Recommendations</b>		
57	<p>The CAP concurs that the most appropriate category for the TSCA Incinerator emissions is "limited public exposures in amounts that are not expected to result in public health effects."</p>	<p>ATSDR appreciates receiving this comment. No changes to the PHA are needed in response.</p>

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Public or Peer Reviewer Comment		ATSDR's Response
58	The PHA conclusions that the TSCA Incinerator destroys organic waste with high efficiencies and that the emissions of trace contaminants do not pose a public hazard are strongly supported by the data and reinforcing arguments.	ATSDR appreciates receiving this comment. No changes to the PHA are needed in response.
59	Mindful of the specific qualifications found within the PHA, the document's conclusions and recommendations appear appropriate.	ATSDR appreciates receiving this comment. No changes to the PHA are needed in response.
60	With the exception of providing an earlier and more complete context for the PHA's direct exposure pathway focus [see Comment #51], the document generally communicates in clear and accurate terms the estimated risks posed by the facility's emissions.	ATSDR appreciates receiving this comment. Refer to responses to Comments #49 to 51 for how ATSDR addressed the issue of providing "earlier and more complete context" of the PHA's focus.
61	A suggestion for future monitoring: collect more specific information on the types of these metals present (e.g., page 64, line 15, "...the relative amounts of trivalent chromium and hexavalent chromium in ambient air near ETTP are not known). They should be. Having these data would likely also obviate the need for "additional evaluation" beyond preliminary screening. This would be included in public health recommendations, page 81, first paragraph (and also recommendation for further action, page 82), and preclude the need for the fourth paragraph in the public health recommendations on page 81 and 82. Having lower detection limits of metals will not help characterize risk more accurately if the metals are all assumed to be present in 100% of their most toxic form for the health assessment.	The comment suggests that ATSDR include a new recommendation for conducting speciated sampling of airborne metals. While such sampling results would certainly provide improved insights for chromium, the analyses in the PHA show that realistic estimates of inhalation exposures using the existing data are below levels of health concern. ATSDR believes that conducting the additional sampling mentioned would probably do no more than confirm the main conclusion, but at a considerable cost. Refer to ATSDR's response to Comment #64 on the recommendation specific to TDEC's ambient air sampling of metals.
62	The recommendations are thoughtful and sound. This reviewer notes that the second objective of the PHA on page 1 is to respond to specific community concerns about the TSCA Incinerator. Recommendations are made on page 81 on how the community should heed air quality warnings by the TDEC. Given that the TSCA Incinerator is operating at a small fraction of its capacity [see page 2 (5% of its permitted limit) or Fig 5 on page 16], it would make for good community relations if, on the days of air quality warning, the waste feed was cut off to the TSCA Incinerator and the Incinerator kept ready for restart by firing with the clean back up fuel. Even though the TSCA Incinerator contributes very small increments to the PM and ozone, given the excess capacity of the Incinerator there is no need to contribute any incremental emissions when there are air quality warnings.	The comment suggests that ATSDR should consider recommending that the TSCA Incinerator cease operating on days with air quality warnings, even though the comment also acknowledges that the TSCA Incinerator's emissions contribute little to the measured concentrations of pollutants that trigger these warnings. While ATSDR can certainly appreciate the argument presented in this comment, ATSDR defers to the state and local environmental agencies for the most appropriate actions to take during the air quality warnings.

Public or Peer Reviewer Comment	ATSDR's Response
<p>63 The report represents an excellent consolidation of voluminous information compiled to educate the public about the history, operation, and environmental impacts of the facility. The factual accuracy, conclusions, and recommendations in the report need to be reviewed in the future against any new information from performance tests and risk assessments associated with ongoing permit renewal requirements. Continuous stack sampling for metals and continuous emission monitoring of particulate matter should be maintained using equipment already installed at the facility and the results used to provide continuing assurance of anticipated performance of emission controls. This may provide for better detection of changed conditions at the incinerator than ambient air sampling and monitoring.</p>	<p>The PHA includes a Public Health Action Plan to ensure that ongoing operation of the TSCA Incinerator will not cause harmful health effects in the future. Specific recommendations in the Public Health Action Plan are consistent with suggestions in this comment (e.g., continued ambient air monitoring, preparation of annual fact sheets). Additionally, the existing regulatory framework requires some of the suggested measurements identified in the comment (e.g., continuous emissions monitoring for certain pollutants). ATSDR is willing to review relevant data that become available in the future, as appropriate.</p>
<p>64 The CAP does not accept Agency for Toxic Substances and Disease Registry's (ATSDR) recommendation that Tennessee Department of Environment and Conservation (TDEC) should achieve lower detection limits in its air-emissions metals monitoring network. The current limits do not make any difference in the PHA results. The monitoring data presented by U.S. Department of Energy (DOE) are supported by various lines of evidence that all indicate the data are accurate. In lieu of expensive instrumental and analytical improvements, the CAP recommends that TDEC perform critical technical oversight of DOE's procedures and review any proposed changes. Improvements in TDEC's monitoring capability eventually may be needed to obtain measurements for purposes other than direct comparison to DOE's data and to allow for continuation of data collection if DOE's monitoring should be discontinued. In the best of all worlds, the TDEC and DOE sampling and analytical procedures should be designed to reinforce one another. However, in a state already short of health related funds, it is not clear that monies should be expended to prove what is indicated to be true by several other methods.</p>	<p>The comment questions the need for ATSDR's recommendation that TDEC achieve lower detection limits in its analysis of metals samples. ATSDR made that recommendation such that TDEC would independently verify the quality of DOE's ambient air monitoring data for metals. ATSDR still believes it is important to verify the accuracy of these data, but agrees that this verification can be achieved in various ways (some being more cost-effective than others). In response to this comment, ATSDR has revised its recommendations to TDEC. The revised recommendations still emphasize the need to independently verify the accuracy of DOE's metals data, but acknowledge different approaches that TDEC can take to do so (e.g., increased oversight of DOE's sampling and analytical procedures, analysis of "split samples" from the filters collected by the sampling devices).</p>
<p>65 Regarding ATSDR's recommendation that TDEC should achieve lower detection limits in its metals monitoring network and, after lowering detection limits, compare its data to DOE's metals monitoring data, the Board is uncertain whether value is added beyond that which could be achieved by critical technical oversight of DOE's procedures and review of any proposed changes. The Board, however, recognizes that improvements in TDEC's monitoring capability may be needed to obtain measurements for purposes other than direct comparison to DOE's data and to allow for continuation of data collection if DOE's monitoring should be discontinued.</p>	<p>As the response to the previous comment notes, ATSDR has revised the recommendation that this comment addresses.</p>

Public or Peer Reviewer Comment	ATSDR's Response
<p>66 TDEC will maintain its commitment of ambient air-monitoring activities at ETTP for metals and radionuclides. TDEC intends to achieve this technical recommendation [to achieve lower detection limits in its metals analysis]. TDEC will issue an annual fact sheet on the environmental status of the TSCA incinerator. TDEC will always seek ways to improve on its annual reporting of its environmental activities. TDEC will, in coordination with the Knox County Department of Air Quality Management, continue to issue the air quality warnings for the Knoxville area.</p>	<p>ATSDR appreciates receiving these assurances. No changes to the PHA are needed in response.</p>
<p>67 TRV openings (See Table 2), Page 17 - The rationale for not analyzing any samples since 1996 would appear to need basis from additional criteria other than a management decision that feed and operating conditions were bracketed by previous events. Periodic analysis may be needed more frequently to identify changes in ambient background concentrations and to assure quality of sampling and analytical procedures. Regarding episodic releases following TRV openings (page 45, lines 19-27): qualify the statement that samples are collected during all TRV events but are no longer analyzed. The recommendation on page 81 regarding continuous ambient air monitoring is not a TRV issue. ATSDR's recommendation for continuing ambient monitoring during TRV events should be stated.</p>	<p>When preparing this PHA, ATSDR considered the need for DOE to analyze a greater fraction of the ambient air samples collected during TRV events. ATSDR determined that its conclusion regarding TRV events would change only if the ambient air concentrations of dioxins, furans, and PCBs were found to be consistently and dramatically higher than those that have been measured to date. ATSDR has no reason to expect that such elevated concentrations will occur. A sensible way of verifying this is to analyze only those samples collected during TRV events associated with high waste feed rates or PCB inputs. In other words, the criteria that DOE currently uses when deciding whether to analyze samples should provide sufficient insights on whether air quality impacts during TRV events are unusually higher than the concentrations that have already been measured. Based on this analysis, ATSDR is not recommending any change to the current ambient air sampling and analysis framework for TRV events.</p>